United Nations A/56/602/Add.1

General Assembly

Distr.: General
13 December 2001

Original: English

Fifty-sixth session
Agenda item 122
Programme budget for the biennium 2000-2001

Integrated Management Information System project

Thirteenth progress report of the Secretary-General

Addendum

Lessons learned from the development and implementation of the Integrated Management Information System

Summary

The successful implementation of the Integrated Management Information System represents a significant achievement for the United Nations in view of the many challenges and difficulties posed by this type of undertaking. These challenges have been compounded by overall increases in administrative activities to be supported following the expansion of peacekeeping operations experienced over the last decade, and the substantial reductions in the administrative capacity of the Secretariat in the context of the overall reduction of posts in the Secretariat in the early and mid-1990s. As indicated in paragraph 237 of the IMIS Independent Experts Study (see A/53/662), "the goals of developing a truly integrated system to interlink the various functionalities and share common data have been realized by the IMIS design." The findings of the experts that "there is no presently available commercial software which offers the full extent of integration of United Nations administrative and business data as that provided by IMIS" are still valid at present.

In spite of the above difficulties and challenges, the Organization now has a fully integrated system which covers all its administrative processes. This has been done at a relatively low cost by industry standards ($78.5 million invested over 13 years). The system supports the consolidation of corporate data from the eight major duty stations. The quality and timely delivery of that data have improved immeasurably as compared with the old systems. All the major duty stations now benefit from a complete administration system, as compared with the past, when the status and availability of systems varied greatly and the smaller duty stations were technologically backward.

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It can also be stated that, with the implementation of IMIS, the United Nations has now become a leader within the United Nations system in the integrated management of resources and administrative processes. Nevertheless, the experience gained from the development and operation of IMIS clearly indicates a need for constant attention to the system's technological status to ensure that its components meet rapidly changing industry standards and respond to the ever-evolving needs of the Organization. In order to continue to benefit from the implementation of IMIS, the Organization must allocate adequate resources to its maintenance and to its further enhancement in order to build on the accomplishments to date.

I. Introduction

1. The twelfth progress report of the Secretary-General on the Integrated Management Information System (IMIS) (A/55/632) stated that the lessons learned from the development and implementation of IMIS would be presented in the next report. The present report summarizes the original goals defined for the system, the scope and the expectations of IMIS, the major achievements and the difficulties encountered in the course of the project development and implementation. It also analyses the causes of those difficulties and recommends possible solutions. It draws extensively on past progress reports as well as on specialized audits and studies of the IMIS project and its implementation.

II. Original goals and expectations of the Integrated Management Information System at the inception of the project and related achievements

2. The report of the Secretary-General on the establishment of an integrated management information system (A/C.5/43/24) describes in detail the background to the project. It also reports on the implementation of the conclusions and recommendations of the study conducted by consultants on the project in 1988.

3. In the mid-1980s it became clear that existing administrative and management systems were no longer able to serve the needs of the Organization. Those systems were fragmented, old-fashioned, incomplete in terms of data-processing and unresponsive. The Organization required a consolidated, corporate database of information which would be current, consistent and reliable, easily accessible and conducive to improved efficiency and productivity. In the context of the changes being made to implement the recommendations of the Group of High-level Intergovernmental Experts (the Group of 18), as well as relevant audit recommendations, priority was given to reviewing the methods of work in the administrative areas in order to simplify current processes and procedures, shorten lines of communications, improve information flows, reduce delays and facilitate further delegation of authority to programme managers while at the same time introducing greater accountability.

4. In its scope, the IMIS project has addressed the objective of a comprehensive approach to the totality of administrative and management functions and the relationships between those functions, as well as a requirement for information to be more complete, more accurate, easily accessible and more timely than was possible with existing systems. In order to cover those requirements, 15 distinct application areas were defined, covering all of the administrative, financial and personnel management activities of the Secretariat in all its major duty stations.

5. In addition to the business processes and functions to be supported by the new system, consideration was given to the technological environment which was required for the system's operation. Two possible scenarios to address those problems were considered. The first scenario was developed with the idea of a large, centrally located mainframe computer. That would provide users with access to the data in all locations, 24 hours a day. The second scenario consisted of a central, Headquarters-located mainframe computer connected, via telecommunications lines, to local mainframe processors located, as required, at the relevant regional sites. The strengths and weaknesses of both scenarios were reviewed thoroughly. Following those analyses, the second scenario was determined to be the most responsive to the needs of the Organization.

6. Three alternatives to the development of the new system were considered: (a) acquiring commercial software; (b) custom-building IMIS; and (c) utilizing and adapting software already available in the United Nations system. The first alternative was not considered practical owing to the lack of software applications that could meet United Nations requirements without substantial modifications, and also owing to the insufficient degree of integration offered by commercial software solutions. The effort required for the second alternative was estimated at 28,000 work-days for project implementation. The third alternative, utilizing software already available, was estimated at 20,500 work-days for development and implementation. Those relatively lower requirements were considered a distinct advantage, and the third alternative was selected at that stage.

7. In terms of implementation, the report of the Secretary-General outlined the application areas that would constitute the core functionality of the system and interfaces with other systems. Out of a total of 15

application areas, the development would focus initially on programme management, post classification, human resource management, personal account, payroll and financial management functions. Following the progress in the development of those areas, other system modules would then be developed.

8. The total cost of developing the system, which was initiated in 1989 and anticipated to be completed in 1992, was estimated at $31,593,500 at that time. Those estimates were based on the experiences of the Food and Agriculture Organization of the United Nations (FAO), whose system was considered to be the best to meet the needs of the United Nations, and on the estimated effort to customize the system. A project team comprising 9 staff members at Headquarters and 21 regional coordinators in the other major duty stations was recommended at that time.

9. In the first progress report on IMIS (A/C.5/44/8), the Secretary-General reported that, although the FAO system had been found to most closely fit the architecture agreed upon for IMIS, the United Nations had been unable to reach an agreement with FAO on the conditions for the utilization of its system. It was therefore decided to proceed rapidly with the development of a system for the United Nations. The United Nations was not able, however, to obtain from FAO the documentation for its automated management system, which could have facilitated the analysis phase of IMIS development.

Observations

10. *In setting out the ways to address the difficulties in managing the totality of the Administration's activities, the scope of the IMIS project was overly ambitious from its inception. It was expected to resolve a whole series of Secretariat administrative problems but the organizational, managerial and administrative implications of the introduction of such a comprehensive system have been underestimated. The system was seen as an answer to the management and administrative problems rather than as a tool to be used by the Administration in managing its resources.*

11. *The decisions made by the United Nations were based on the experience of FAO, which was the only available at that time. The projected budget was established on the basis of that experience and on the costs for customization of the existing FAO system. No adjustment was made to the estimated costs or to the related budgetary provisions when it was decided to proceed with the customized building of a new system. Similarly, the time frame for the project implementation was not adjusted accordingly, although the effort to build a system "from scratch" was expected to be much greater than the customization of the FAO system. That, in fact, was confirmed by the audit of the FAO system carried out by the Board of Auditors in 1989. The Board reached the conclusion that, despite expenditures in excess of $30 million, there were still many outstanding issues and problems.*

12. *The absence of a commercially available integrated software solution that could meet all the needs of the United Nations in the required application areas, noted in 1988, is still a fact in the year 2001. The decision to develop a custom-built system for the United Nations appears to be have been the only appropriate one under the circumstances.*

III. Initial stages of the Integrated Management Information System project (1989-1990)

13. The second progress report of the Secretary-General on IMIS (A/C.5/45/20) focused on the following four areas: (a) progress of work; (b) plans for the end-1991 to 1992 period; (c) benefits to be derived; and (d) role of the IMIS project as a major component of the reform process of the Organization. The progress of work centred on the areas of analysis of requirements and the system design, while the plans for end-1991 to 1992 were focused on programming and training. It was expected at that time that the system would become operational in 1993.

14. The benefits to be derived from IMIS, as described in the second progress report, were based on the improvements derived from the information being at the disposal of the Organization. As was stated in the second progress report, IMIS was considered to be a key component in the reform process of the United Nations to ensure that the future activities of the United Nations were carried out with all the efficiency and effectiveness required by the mandates and priorities legislated by the General Assembly. The report also stated that the goals of the reform process mandated by the General Assembly included greater control over the

United Nations administrative budget while increasing the quality of the service provided.

15. A firm of outside consultants was engaged in 1990 to carry out the detailed analysis of user requirements and the logical design of IMIS. At that time, the design was reviewed at all duty stations, as well as at the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF) and the Office of the United Nations High Commissioner for Refugees (UNHCR), whose requirements were also considered. While, in general, the consultants' recommendations were useful, it has become evident over time that the need for a reporting functionality was underestimated at that time and the reporting requirements were not adequately addressed in those analyses. That had significant repercussions on the system design, the effects of which were felt later.

Observations

16. *In addition to the overly high expectations of the benefits of the new system, there was a lack of understanding within the Secretariat of the impact of introducing a new system such as IMIS, and a lack of experience with integrated systems. It should be noted that integrated enterprise resource planning systems were not commercially available at the time. Furthermore, the project was largely seen to be a technical issue to be left to the project team, although at the same time it was expected to resolve administrative and managerial issues.*

17. *It is evident now that the 12 months spent by consultants on functional requirements analysis were insufficient to address the scope of the organizational issues involved. It had not been customary to document business processes and, in cases where detailed procedures were lacking or incomplete, initiatives of individuals had led to inconsistencies in the application of regulations and rules. As a result, the initial system design reflected an incomplete understanding of many existing administrative practices and procedures. No attempt was made to re-engineer business processes. Owing to the lack of workflows, the request for proposals for the design of the system also included the preparation of administrative workflows. Those were drawn up by the consultants for the first time. However, although the reviews of United Nations business processes were conducted, the administrative procedures as initially reflected in the project design were the result of an incomplete understanding of the business processes.*

18. *As regards training, although it was considered to be virtually a project in itself, which could be incorporated into the overall project in a phased manner, no budgetary provision was made at that time to cover that activity. Similarly, the budget did not provide for other implementation activities, such as the data cleaning and conversion. Furthermore, from the beginning an insufficient provision had been made for the implementation of the system at offices away from Headquarters.*

IV. Progress after 1990: delays, cost overruns and corrective measures

19. The delays in the project implementation and cost overruns prompted the General Assembly, in its decision 48/492 of 14 July 1994, to request the Board of Auditors to conduct a special audit of the IMIS project. In its report (A/49/680, annex), the Board summarized the following findings on the main reasons for the delays and increased costs of the project:

(a) The scope of the project had been underestimated and, as a result, the external design took longer than expected;

(b) The original time assessments for the development of the software were also underestimated and had to be increased considerably;

(c) There was apparent understaffing of the in-house development team and an inadequate budget provision for the implementation activities;

(d) Given the lack of available in-house expertise, both the development team and the contractor staff had to be diverted to implementation-related activities;

(e) The understaffing led to delays on the part of the United Nations in discharging its contractual responsibilities, including the review and approval of the functional requirements;

(f) There were delays in converting the data from existing systems to IMIS.

In its overall conclusions, the Board noted that corrective measures had been taken as recommended

by the Board in its audit report for the biennium 1992-1993. It has also confirmed the importance and complex nature of the project.

20. It should be noted that, in terms of the costs involved, IMIS compares favourably with other information technology projects of similar size and complexity. The report of the Standish Group International, Inc. on similar projects indicated that the average cost overrun for all similar projects was 189 per cent, while for large companies it was 178 per cent of the original budget. In comparison, the total cost of $77.6 million for IMIS against an initial estimate of $31.5 million represents an overrun of 146 per cent against the initial budget. As regards time overruns, the above-mentioned study concluded that the average overrun for large projects was 230 per cent, as compared with some 200 per cent for IMIS.

21. In terms of content, the study referred to above found that other similar projects were implemented without the full range of functions and features. Those projects included only 61 per cent of originally specified features and functions on average. As a point of comparison, IMIS includes all of the planned components foreseen in the original stages of development, namely: programme management, post classification, human resource management, personal accounts, payroll and financial management. Although the need for reports was initially underestimated, a comprehensive reporting tool has been developed. It is currently used on a regular basis, allowing for standardized reports worldwide. Furthermore, in addition to the well-documented workflows that have been developed, IMIS has help screens, full documentation of desk procedures online and an online training database accessible to all users. All these were not foreseen in the original design.

22. In terms of time frame, the original intention was to implement the system in a "big bang" approach with all modules and functionality being released at the same time at Headquarters and afterwards at three-months intervals in the other duty stations. In January 1992, it was realized that that was not possible. A phased implementation approach was then adopted. That has led to the extension of the implementation time, including time for the extensive data cleanup activities for human resource and finance data. That change in plans was due to the status of the data in the legacy systems, which was not well known in advance, and to more stringent requirements imposed by the new system on the quality of the data. That delayed the implementation of the system.

23. The technological platform for the system was another area that was revised following the initial proposals. That included a central mainframe at Headquarters and locally maintained mainframes at offices away from Headquarters. Owing to the evolving nature of information technologies, Deloitte & Touche, the consultants who performed the next IMIS design phase, delivered their recommendation for the current IMIS technical platform. Its recommendation examined the major components of an administrative information system and was subsequently adopted for the next IMIS construction phase. The recommendation included Unix as an operating system, owing to its open and non-proprietary nature, and Transmission Control Protocol/Internet Protocol (TCP/IP) as the networking operating system. A graphic user interface tool was considered to be better for this type of system. As regards the implementation of local databases, the Systemhouse consultants' study of 1988 has proposed an option of maintaining individual databases at Headquarters and at offices away from Headquarters, with their contents synchronized by a distributed database software. Given the relatively slow advances in this technology and the condition of the communications infrastructure between Headquarters and offices away from Headquarters in the early 1990s, Deloitte & Touche recommended individual and local databases, with their contents to be coordinated via software extensions created in IMIS. It was considered at that time that the approach would ensure the autonomy of local operations in each office.

24. The above shortcomings were thoroughly analysed and their implications taken into account when developing supplementary proposals for the system redesign and expansion in mid- and late 1990s. By a number of successive resolutions, the latest of which is resolution 53/219 of 7 April 1999, the General Assembly has accepted those proposals and progressively increased the budget of the project up to $77.6 million.

Observations

25. *The scope of the project and its impact on the Organization were underestimated. As has become clear now, the insufficient resources assigned to the design definition stages of the project resulted in*

delays, flaws and omissions in the design, which later made costly changes to the design necessary and prompted out-of-scope activities. There were also delays in the resolution of procedural issues. On the other hand, there was a transparency in the project's management and development which facilitated the audits and other reviews as well as the implementation of the corrective measures recommended by the auditors.

26. *During the stages of development, it became clear that functional requirements must prevail over technical issues, and that the full understanding of those requirements was dependent on inputs from the management and the user community. The corrective measures in that respect had not always been sufficiently comprehensive and timely.*

V. Implementation of the system at Headquarters and in other duty stations

27. The implementation of the system at Headquarters and in the other duty stations uncovered many of the issues referred to above, including insufficient provision of resources for implementation activities, in particular for data cleanup and conversion and for training. It became clear that a "big bang" approach would not have been feasible, given the number and the extent of policy, procedural, workflow and data issues to be addressed. It was also necessary for Headquarters staff members with the relevant experience and expertise to travel extensively to the major duty stations to provide assistance and support for the system implementation. Thus, concurrent implementations of the system in different duty stations would have been too heavy a burden on the resources of the releasing duty stations, largely Headquarters, but also other duty stations whose staff participated in implementations away from their home duty station. To a large extent, when staff members were released by their departments, their regular workload had to be assumed by other staff members.

28. The implementation of IMIS commenced at Headquarters in September 1993 with the human resources application. The initial attempts at conversion of data into IMIS resulted in incomplete or inaccurate records for significant numbers of staff members, dependants and household members. Post incumbency data also required significant levels of review and cleanup. While the extent of the cleanup effort had been underestimated, it presented a unique opportunity to correct the records. Thus, in early 1994 a specific task force was assigned with the responsibility of reviewing and completing the preparation of source data for IMIS. The staff data was subsequently converted into IMIS for a second time. It was, thus, necessary to have recourse to the contractor's staff, thereby adding to the contractual costs and temporarily diverting resources from other development work.

29. The human resources application was implemented in the offices away from Headquarters, starting in June 1996 and ending in February 1998. While each office was able to benefit from the experience of those implemented earlier, significant data cleanup efforts were required in all major duty stations. Staff members from Headquarters were sent to the other offices to assist with training and to advise on data cleanup procedures prior to conversion. Technical staff members were also assigned to the other major duty stations where the introduction of the system was the catalyst for the installation of new computer equipment and the upgrade of the local infrastructure, including local area networks.

30. The finance application was scheduled for implementation in 1994. However, it was postponed because of deficiencies in the initial design, which required some work in 1994 and 1995 for the design corrections. The finance application was implemented at Headquarters in April 1996. The travel application was implemented in September 1997. That enabled the completion of the new functionality to take into account the requirements of users. The implementation of both applications in the other major duty stations commenced in July 1999 and was completed in July 2001. The implementation experience gained in those duty stations where the system was implemented first was very useful for the subsequent steps.

31. The implementation of the payroll application commenced with a target population of staff at Headquarters in September 2000, followed by payrolling in IMIS of all Headquarters staff in New York in January 2001. The payroll functionality is currently being implemented in the other duty stations. The integrated nature of the system and the importance of maintaining up-to-date and accurate information on staff members have proven to be critical success

factors in the implementation of the payroll application.

Observations

32. *The success of the various implementations has depended on a number of factors, including the following:*

(a) Careful and detailed planning and the establishment of a clear management structure for the project and its tasks, responsibilities and timelines. That allowed for constant monitoring of progress and for corrective actions identified and taken promptly, as necessary;

(b) Adequate data preparation from the legacy systems into IMIS prior to conversion. That implied: (i) the allocation of sufficient resources to the cleanup effort; and (ii) a conversion strategy which included the "staging" of data extracted from the old system in an interim and testing environment before it was ready to be loaded into the production system. The progress of the cleanup efforts was closely monitored and its results constantly analysed;

(c) Expertise gained in each duty station was shared in the course of later implementations. Such information-sharing was made possible in many cases by the use of the same staff members. It allowed a unique transfer of knowledge that contributed to the harmonizing of procedures and workflows as much as practicable from one duty station to another. At the same time, the system is flexible enough to allow differences in workflows and distribution of tasks adapted to local conditions where necessary;

(d) While every effort was made to adhere to the timeline for each implementation, postponing the actual implementation date, at times by a matter of days, proved to be a worthwhile strategy in the interests of completing data preparation prior to implementation, allowing a smooth start to operations with the new system;

(e) The Organization has built up a unique knowledge base of the rules and regulations in the different functional areas, which would be capitalized on for the future.

33. *The decision not to adopt the "big bang" approach to implementing was justified in terms of both risk assessment and the functional applications (releases) of the system as well as timely implementation in the various duty stations. The staged progressive implementation of the system by functionality and by duty station has allowed the utilization of experiences and lessons learned from the early implementations.*

VI. Organizational involvement in the project and change management

34. As has been already noted, the Organization assigned a key role to the project and the new system in the change of management. However, the impact of the new system and the scope of the undertaking was underestimated. From its inception, the project was hampered by insufficient resources. On the other hand, functional specialists with a comprehensive knowledge of United Nations business processes and the necessary skills to work with the development team were lacking or were not identified. That was underscored in the 1998 findings of the Independent Experts, namely that "successful systems development entailed a high degree of user involvement and dedicated participation in confirming specifications, user system testing and in loading data into the new system. In light of the organizational circumstances concerning the availability of knowledgeable substantive resources, the United Nations failed to provide adequate substantive expertise to focus on articulating the requirements and specifications." (see A/53/662, para. 262.)

Observations

35. *Given the impact of the new system and the need for a review of policies and procedures, the project would have benefited from more commitment on the part of management. Until 1994, the system was largely considered to be a technical issue, which meant that issues were resolved too slowly. The administration did not realize at the early phase of the project that management leadership is a key success factor for projects of this nature. Furthermore, early opportunities for re-engineering business processes were missed. In addition, the implementation of the initial releases of IMIS was difficult owing to a lack of understanding that the system was designed as a tool to*

understanding that the system was designed as a tool to assist the implementation of change, rather than to be the solution to management's problems. On the other hand, lack of understanding of the need for a commitment from management also hindered the realization of the goals of early delegation of authority with greater accountability.

VII. Conclusions

36. **The major lessons learned from the IMIS project can be summarized as follows:**

(a) Establishing a realistic scope for a project is a critical success factor;

(b) Comprehensive planning of the project is a key factor in its success. Resource planning must include all activities, as well as all direct and indirect costs, in order to avoid cost and time overruns;

(c) The commitment and support of the Organization is an important factor in projects of such size and complexity from the outset for their successful implementation, in particular in terms of providing for adequate resources;

(d) A staged implementation of the system, rather than a "big bang" implementation, is a more realistic approach that allows for corrective steps, as and when required.

37. **The United Nations has succeeded in developing a system that supports all the administrative activities of the Organization. The level of success may be evaluated by comparing it with the success rate of information technology projects of this type industry-wide. In large companies, only 9 per cent of projects are completed on time, within its budget and with all features and functions as initially specified (see the report of the Standish Group International, Inc. "Charting the Seas of Information Technology. Chaos" 1994). Furthermore, 61.5 per cent of all large company projects are completed with expenditures incurred in excess of an established budget, with a substantial delay against the established time frame while offering fewer features and functions than initially specified. Some 29.5 per cent of such projects are cancelled before completion.**

38. **The benefits of the system now implemented include the full documentation of the administrative processes of the United Nations. Rules and procedures may now be applied in a consistent manner. The documentation includes online manuals and desk procedures that did not exist before. There is online training available to staff at all major duty stations. The system has introduced a uniform structure for capturing the administrative data of the Organization, which in turn allows for standardized reporting worldwide. The implementation of the system has acted as the catalyst for the upgrade and enhancement of the information technologies used in all duty stations in the performance of administrative processes. It has changed the management culture within the Secretariat and working habits of staff members.**

39. **In the prior reports on the IMIS implementation and in the course of discussions of the project by the General Assembly, the Under-Secretary-General for Management has consistently stated that, in his opinion, a key factor in the IMIS success was the dedication of the IMIS team and the cooperation of the other parts of the Secretariat. He also stated that there had been critical support from Member States, the Board of Auditors and the Office of Internal Oversight Services. If the IMIS project had not been carried out, it would be necessary now to formulate such a project.**